

BRIAN SUTTON

Curriculum Vitae

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Department of Mathematics
Randolph-Macon College
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Awards Fourteenth Leslie Fox Prize

- A biennial prize of the Institute of Mathematics and its Applications, United Kingdom, for a contribution to numerical analysis
- First Place for computing the complete CS (cosine-sine) decomposition, 2009

Professional appointments

Randolph-Macon College

- Assistant Professor, 2005–present

Massachusetts Institute of Technology

- Recitation Instructor, 2003–2004

Education Massachusetts Institute of Technology

- Ph.D., Mathematics, 2005
- *The Stochastic Operator Approach to Random Matrix Theory*, Ph.D. thesis, advised by Alan Edelman

Virginia Tech

- B.S., Mathematics, in Honors, *Summa Cum Laude*, 2001
- B.S., Computer Science, *Summa Cum Laude*, 2001

Federal grants

National Science Foundation, DMS/Computational Mathematics

- DMS-0914559: Stable and efficient computation of the CS decomposition, 2009–2012

National Science Foundation

- Graduate Research Fellowship, 2002–2005

Publications and preprints

Numerical linear algebra, random matrices, and stochastic differential operators

1. “Computing the complete CS decomposition.” *Numer. Algorithms*. 50 (2009), no. 1, 33–65.
2. “The beta-Jacobi matrix model, the CS decomposition, and generalized singular value problems,” with A. Edelman. *Found. Comput. Math.* 8 (2008), no. 2, 259–285.

3. “From random matrices to stochastic operators,” with A. Edelman. *J. Stat. Phys.* 127 (2007), no. 6, 1121–1165.
4. *The Stochastic Operator Approach to Random Matrix Theory*, Ph.D. thesis, MIT, Cambridge, MA, 2005.
5. “Tails of condition number distributions,” with A. Edelman. *SIAM J. Matrix Anal. Appl.* 27 (2005), no. 2, 547–560.

Combinatorial matrix analysis

6. “Implicit construction of multiple eigenvalues for trees,” with C. R. Johnson and A. J. Witt. *Linear Multilinear Algebra.* 57 (2009), no. 4, 409–420.
7. “On the minimum rank among positive semidefinite matrices with a given graph,” with M. Booth, P. Hackney, B. Harris, C. R. Johnson, M. Lay, L. Mitchell, S. K. Narayan, A. Pascoe, K. Steinmetz, and W. Wang. *SIAM J. on Matrix Anal. Appl.* 30 (2008), no. 2, 731–740.
8. “Hermitian matrices, eigenvalue multiplicities, and eigenvector components,” with C. R. Johnson. *SIAM J. Matrix Anal. Appl.* 26 (2004/05), no. 2, 390–399.
9. “On the relative position of multiple eigenvalues in the spectrum of an Hermitian matrix with a given graph,” with C. R. Johnson, A. Leal Duarte, C. M. Saiago, and A. J. Witt. *Linear Algebra Appl.* 363 (2003), 147–159.

PDE’s

10. “Identification problem for the wave equation with Neumann data input and Dirichlet data observations,” with X. Feng, S. Lenhart, V. Protopopescu, and L. Rachele. *Nonlinear Anal.* 52 (2003), no. 7, 1777–1795.

Presentations and posters

Randolph-Macon College, Department of Philosophy, Oct. 2009

- “Deconstruction, mathematically speaking”

Fourteenth Leslie Fox Prize Meeting, Warwick University, Jun. 2009

- “Computing the complete CS decomposition”

Twenty-third Biennial Conference on Numerical Analysis, University of Strathclyde, Jun. 2009

- “An algorithm for the complete CS decomposition and an application to quantum computing”

University of Colorado at Boulder, Apr. 2009

- “From random matrices to stochastic operators”

University of Maryland, Mar. 2009

- “The CS decomposition: random matrix theory and computation”

Householder Symposium XVII, Zeuthen, Germany, Jun. 2008

- “Computing the complete CS decomposition”

The College of William and Mary, Feb. 2008

- “Computing the complete CS decomposition”

University of Alabama, Jan. 2008

- “Computing the complete CS decomposition”

Joint Mathematics Meetings, San Diego, CA, Jan. 2008

- “Computing the complete CS decomposition”

Virginia Tech, Oct. 2007

- “Computing the complete CS decomposition”

University of Virginia, Sept. 2007

- “Computing the complete CS decomposition”

MAA MD-DC-VA Section Meeting, Roanoke, VA, Apr. 2007

- “From random matrices to stochastic operators”

Joint Mathematics Meetings, New Orleans, LA, Jan. 2007

- “From random matrices to stochastic operators”

SAMSI Program on High Dimensional Inference and Random Matrices, Research Triangle Park, NC, Sept. 2006

- “From random matrices to stochastic operators”

Naval Surface Warfare Division, Dahlgren, VA, Jul. 2006

- “A new Central Limit Theorem? An introduction to random matrix theory”

Workshop on Stochastic Eigenanalysis and Applications, MIT, Jul. 2006

- “From random matrices to stochastic operators”

Randolph-Macon College, Feb. 2005

- “From Photoshop to programming languages”

The College of William and Mary, Jan. 2005

- “Random matrix theory: beyond real and complex”

Rocky Mountain Mathematics Consortium summer workshop, University of Wyoming, Jul. 2001

- “Graphs and eigenvalue multiplicities”

Virginia Tech, May 2001

- Department of Mathematics commencement address

Workshops attended

Brownian Motion and Random Matrices, American Institute of Mathematics, Palo Alto, Dec. 2009

SAMSI Program on High Dimensional Inference and Random Matrices, Research Triangle Park, NC, Sept. 2006

Recent Perspectives in Random Matrix Theory and Number Theory, Isaac Newton Institute, Cambridge, UK, Mar.–Apr. 2004

Rocky Mountain Mathematics Consortium Summer Conference: Combinatorics and Matrix Theory, University of Wyoming, Jul.–Aug. 2001

Teaching Randolph-Macon College

- Development and Disease (FYEC 191)
- Infinity! (HONR 269)
- Introduction to Finite Mathematics (105)
- Introductory Statistics (113)
- Calculus I–II (131–132)
- Differential Equations (307)
- Probability (371)
- Mathematical Statistics (372)
- Mathematics Seminar (415)
- Numerical Analysis (442)
- Vector Calculus (independent study)

MIT

- Recitation instructor for Multivariable Calculus with Theory (18.022)
- Recitation instructor for Linear Algebra (18.06)

Research advising

Tian Xu

- Senior seminar project on mathematical finance, R-MC, 2009

James Olson

- Senior seminar project on canonical correlation analysis, R-MC, 2009

Ronald Pandolfi

- Senior seminar project on probability distributions and orthogonal polynomial systems, R-MC, 2008
- Departmental honors project on the numerical stability of determinant algorithms, R-MC, 2008

Kennard Stauffer

- Departmental honors project in numerical linear algebra with applications to quantum mechanics, R-MC, 2006

Matthew Booth

- Research Experiences for Undergraduates project on an inverse eigenvalue problem involving the zero/nonzero structure of a matrix, College of William and Mary, 2003

Intramural grants and scholarships

Walter Williams Craigie Grant for summer research at R-MC, 2007 and 2009

MIT Presidential Fellowship, 2001–2002

Additional education and employment

College of William and Mary

- Research Experiences for Undergraduates, 2000

University of Tennessee and Oak Ridge National Laboratory

- Research Experiences for Undergraduates, 1999

Meridium, Inc., Roanoke, VA

- Software development and testing, 1996, 1998